ACTIVITY REPORTING FORM
FOR CDC GRANTS PROGRAM
IMU Simons African Fellowship Program

(Deadline for completion: four (4) week after the end of the research visit)

Please note that at least four pictures of the supported activity should be included/ attached to this report.
(by email).
After consideration by CDC, the intention is that this activity report and pictures will be made publicly available on the CDC website.

Name of grantee: PATRICK MIMPHIS TCHEPMO DJOMEGNI
Home institution and country of grantee: ARBA MINCH UNIVERSITY, ETHIOPIA
Name of the host: LUDOVIC RIFFORD
Name of the host institution and country: CENTRE INTERNATIONALE DE MATHEMATIQUES PURE ET APPLIQUEES,
FRANCE
Topic of the research activity: LOCALLY SOLVABLE PARTIAL DIFFERENTIAL RELATIONS OF SECOND ORDER
Dates spend at the center/host institution: 02 SEPT – 08 OCT, 2019

The progress report should be a brief (one page) activity report:

1. Summary statement (1-2 sentences) of major outcome of your visit:

    This research visit enables me to grasp the concept of differential relations which includes knowledge on fibration, homotopy, h-principle, jets, holonomic approximations and convex integration. I was my first time to be introduced to such topics.

2. Brief description of your research activities during your research visit:

    The main objective of the research was first to understand some results on differential relations of order one, then produce new results for order two. My research activities during my visit were:
    -   understanding the proof of the solvability of open ample ordinary differential relations of order one using the method of convex integration
    -   understanding the proof of the solvability of open ample partial differential relations of order one using the method of convex integration
    -   proposing more simplified and visible proofs for the above results
    -   conducting a seminar in the Laboratoire J.A. Dieudonne at the Department of Mathematics, Nice Sophia Antipolis University
    -   Writing a proof for partial differential relations of order two.

3. Students and post-doctoral fellows advised:

    NONE

4. Joint activities with your host:

    -   Understanding together the above proofs
    -   Investigating how to relax some conditions on the second order partial differential relations
    -   Submitting an application to organize a CIMPA research school in Arba Minch University in 2021
    -   Discussing about my mission to Ndjamena University (Chad) in November, for an eventual collaboration with CIMPA
    -   Discussing on the collaboration between CMPA and Arba Minch for this academic year

5. Research in progress (as a result from the visit):

    -   Rewriting a more clearly proof for solvability of partial differential relations of order one (to be submitted for publication when ready)

- Studying the solvability of differential relations of order two

6. Papers published or in preprint form as a result from the research visit:
     In progress

7. Planned future activities as a result of your research visit:

    - Hosting Ludovic Rifford in Arba Minch in February for working on this topic
    - Vising Ndjamena University in November for teaching and examining a collaboration with CIMPA
    - Visiting Ludovic next year
    - Publishing our work in peer reviewed journals

With my signature I agree that my <u>Activity Report</u> and <u>pictures</u> can be published on the CDC website.

Date: 15/10/2019
Signature Grantee: